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EOS Core System (ECS) Project Contract No. NAS5-60000

March 7, 1997

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March 5, 1997

Document No.: 224-CD-001-001

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224-CD-001-001

EOSDIS Core System Project

Release B Release Plan for the ECS Project

February 1997

Hughes Information Technology Systems
Upper Marlboro, Maryland

Release B Release Plan for the ECS Project

February 1997

Prepared Under Contract NAS5-60000
CDRL Item #145

APPROVED BY

Paul W. Fingerman /s/ 2/28/97

Paul W. Fingerman, Chairman, ECS CCB Date
EOSDIS Core System Project

Hughes Information Technology Systems
Upper Marlboro, Maryland

224-CD-001-001

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Preface

This document incorporates several agreements that have been made with ESDIS since the 18 November 1996 Release B Replan. These agreements are as follows:

a. The ECS Release B Client will be the web-based Client known as “JEST”. Release B will support the Version 0 X-Client and Web Client (essentially Version 0 level of service). For the Release B.0 Integration and Test Phase, the Version 0 X-Client will provide the Client interface capability. JEST and its associated Data Management infrastructure will be delivered “just in time” for B.0 operations. While JEST will not be formally integrated until late in the ECS I&T Phase, it will undergo testing by the ECS Test Organization prior to release to the user community.

b. LIM/DIM and DDICT services are deferred from Release B.0 to Release B.1.

c. ASTER two-way interoperability is deferred from Release B.0 to Release B.1.

d. Data Server Subsystem (DSS) quality control and performance reporting functions are deferred from Release B.0 to Release B.1.

e. Barcode handling for ingest media check-in is deferred from Release B.0 to Release B.1.

f. Document Data Server capabilities are deferred from Release B.0 to Release B.1.

g. Automated support to policies/procedures management is deferred from Release B.0 to Release B.1.

h. ECS is not responsible for providing support to the TRMM mission.

i. Subsetting of swath data by parameter is provided in Release B.0 to support the processing of MODIS Level 1B data by the CERES instrument team. Landsat 7 WRS scene based subsetting remains in Release B.0, and all other subsetting is deferred to Release B.1 to be consistent with DSWG priorities.

A draft of this document was been published as an ECS white paper, 222-WP-005-001, "Release B Release Plan for the ECS Project." The white paper will be obsolete upon submittal of this CDRL document.

This document is a contract deliverable with an approval code 2. As such, it does not require formal Government approval; however, the Government reserves the right to request changes within 45 days of the initial submittal. Once approved, contractor changes to this document are handled in accordance with Class I and Class II change control requirements described in the EOS Configuration Management Plan, and changes to this document shall be made by document change notice (DCN) or by complete revision.

Questions regarding technical information contained within this document should be addressed to the following ECS and/or GSFC contacts:

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Abstract

This document describes the ECS Functional Capabilities and services that are to be provided for Releases B.0 and B.1. It includes a table listing functional capabilities for Releases B.0 and B.1 by subsystem and text describing these functional capabilities, by release.

Keywords: B.0, B.1, Release B, replan, functionality, subsystem, mission, interface, testing

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Change Information Page

List of Effective Pages	
Page Number	**Issue**
Title	Original
iii through xiv	Original
1-1 and 1-2	Original
2-1 through 2-4	Original
3-1 through 3-4	Original
4-1 through 4-12	Original
5-1 through 5-12	Original
6-1 through 6-12	Original
AB-1 through AB-3	Original

Document History			
Document Number	**Status/Issue**	**Publication Date**	**CCR Number**
224-CD-001-001	Original	February 1997	97-0169

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Contents

6. Detailed Description of Release B.1 Functionality

List of Tables

Abbreviations and Acronyms

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1. Introduction

1.1 Identification

This Release B Release Plan for the ECS Project fulfills Contract Data Requirement List (CDRL) Item 145 and Data Item Description (DID) 224/SE2 as proposed in ESDIS Configuration Change Request (CCR) 505-01-41-035-C. When that CCR is approved, this document will be a required deliverable under the Earth Observing System Data and Information (EOSDIS) Core System (ECS) Contract NAS5-60000.

1.2 Scope

This Release B Release Plan captures the results of the ECS Release B replanning effort. It lists the ECS functional capabilities and services to be delivered under contract NAS5-60000 in the newly defined Releases B.0 and B.1. It documents which capabilities will be delivered with Release B.0, and which capabilities will then be added to Release B.0 to create Release B.1.

1.3 Purpose

This document is intended to provide a high-level and easily accessible description of newly defined releases B.0 and B.1 of the ECS Project. It summarizes the system requirements for each of these releases as expressed in authorized Level 3 requirements and interface requirements for the ECS project. It is not intended to be a technical reference to those requirements. It does not address the project's Level 4 requirements or design implementation.

1.4 Status and Schedule

This submittal of DID 224/DV2 meets the 21 February 1997 delivery milestone in the change to the Contract Data Requirements List of NASA contract NAS5-60000 proposed by ESDIS CCR 505-01-41-135-C.

1.5 Organization

This document is organized as follows:

Section 1 provides information regarding the identification, scope, purpose, status, and organization of the Release B Release Plan.

Section 2 is a listing of related documents used as sources for this document as well as documents that furnish further information related to this one.

Section 3 is an executive summary of the site delivery dates, mission objectives, external interfaces and functional capabilities provided by Releases B.0 and B.1.

Section 4 is an overview of the functional capabilities and services associated with Releases B.0 and B.1. Included is a table that lists the functionality provided by each SDPS and CSMS subsystem.

Section 5 is a detailed description of the functional capabilities provided by Release B.0. This section is structured to follow the order of the B.0 functionality listed in Table 4-1.

Section 6 is a detailed description of the functional capabilities provided by Release B.1. This section is structured to follow the order of the B.1 functionality listed in Table 4-1.

2. Related Documentation

2.1 Parent Documents

The parent documents are the documents from which the scope and content of this Release B Release Plan for the ECS Project are derived.

209-CD-002-004	Interface Control Document Between EOSDIS Core System (ECS) and ASTER Ground Data System
209-CD-013-004	Interface Control Document Between EOSDIS Core System (ECS) and the Landsat 7 System
423-41-01	Goddard Space Flight Center, EOSDIS Core System (ECS) Statement of Work
423-41-02	Goddard Space Flight Center, Functional and Performance Requirements Specification for the Earth Observing System Data and Information System (EOSDIS) Core System (ECS)
505-41-11	Goddard Space Flight Center, Interface Requirements Document Between Earth Observing System Data and Information System (EOSDIS) and Version 0 System
505-41-12	Goddard Space Flight Center, Interface Requirements Document between EOSDIS Core System (ECS) and Science Computing Facilities
505-41-13	Goddard Space Flight Center, Interface Requirements Document between Earth Observing System Data and Information System (EOSDIS) and the Landsat 7 System
505-41-18	Goddard Space Flight Center, Interface Requirements Document between Earth Observing System Data and Information System (EOSDIS) and MITI ASTER GDS Project
505-41-19	Goddard Space Flight Center, Interface Requirements Document between the EOSDIS Core System (ECS) and the National Oceanic and Atmospheric Administration (NOAA) Affiliated Data Center (ADC)
505-41-22	Goddard Space Flight Center, Interface Requirements Document between the EOSDIS Core System (ECS) and the Stratospheric Aerosol and Gas Experiment (SAGE III) Mission Operations Center (MOC)

505-41-30	Goddard Space Flight Center, Interface Control Document Between the EOSDIS Core System (ECS) and the Version 0 System for Interoperability
505-41-33	Goddard Space Flight Center, Interface Control Document (ICD) Between EOSDIS Core System (ECS) and Science Computing Facilities (SCF)
505-41-36	Goddard Space Flight Center, Interface Control Document Between the EOSDIS Core System (ECS) and the National Oceanic and Atmospheric Administration (NOAA) for the ECS Project
505-41-39	Goddard Space Flight Center, Interface Control Document Between the EOSDIS Core System (ECS) and the Langley Research Center (LaRC) Distributed Active Archive Center (DAAC) for the ECS Project
505-41-40	Goddard Space Flight Center, Interface Control Document Between the EOSDIS Core System (ECS) and the Goddard Space Flight Center (GSFC) Distributed Active Archive Center (DAAC) for the ECS Project
505-41-42	Goddard Space Flight Center, Interface Control Document Between the EOSDIS Core System (ECS) and the Oak Ridge National Laboratory (ORNL) Distributed Active Archive Center (DAAC) for the ECS Project
505-41-47	Goddard Space Flight Center, Interface Control Document Between the EOSDIS Core System (ECS) and the Stratospheric Aerosol and Gas Experiment (SAGE III) Mission Operations Center (MOC)
510-ICD-EDOS/EGS	Goddard Space Flight Center, Interface Control Document Between the Earth Observing System (EOS) Data and Operations System (EDOS) and the EOS Ground System (EGS)
522-FDD-96/010R0UD0	Goddard Space Flight Center, Earth Observing System (EOS AM-1 Flight Dynamics Division (FDD)/EOSDIS Core System (ECS) Interface Control Document
560-EDOS-0211.0001R1	Goddard Space Flight Center, EDOS Interface Requirements Document (IRD) Between the Earth Observing System (EOS) Data and Operations System (EDOS) and the EOS Ground System (EGS) Elements

2.2 Applicable Documents

The following documents are referenced within this Release B Release Plan for the ECS Project, or are directly applicable, or contain policies or other directive matters that are binding upon the content of this volume. Please note that Internet links cannot be guaranteed for accuracy or currency.

605-CD-002-001	Release B SDPS/CSMS Operations Scenarios
220-TP-001-001	Operations Scenarios - ECS Release B.0 Impacts
none	ECS SDPS and CSMS Release B Level 4 Requirements: http://newsroom.hitc.com/rtm/rhp-rb.html

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3. Summary

To mitigate the schedule risk associated with the delivery of the full capability of the ECS Release B, the Release B functional capability has been divided into two operational Releases, B.0 and B.1. Release B.0 has been structured to provide an operational system to support the launch of the EOS instruments on the AM-1 and Landsat-7 spacecraft, and the SAGE III instrument. Release B.1 provides the full Release B and it provides the operational support for the ADEOS II and RADAR ALT missions.

Release B.0 has been structured to provide the functional capabilities and services to support pre-launch and launch support activities. Release B.0 contains the software to support all external operational interfaces and the associated EOS Mission Integration Testing and Ground System Integration Testing that will be performed for the AM-1, Landsat-7, and SAGE III missions. Table 3-1 below lists the mission objectives, external interfaces and high level functional capabilities supported by Release B.0.

Release B.0 is acceptance tested at four DAACs 5-6 months prior to launch of the instruments supported by the DAAC. This schedule is intended to support the EGS Ground System Integration and Mission Integration activities defined in the Earth Science Data & Information System Master Schedule.

Release B.1 has been structured to provide the full Release B capabilities to support the AM-1, Landsat-7, ADEOS II, RADAR ALT, and SAGE III missions. Release B.1 provides the full Release B capacity for data archival and data processing, and provides support for science data processing for Levels 1-3. Table 3-2 below lists the mission objectives, external interfaces and high level functional capabilities supported by Release B.1.

Release B.1 will be acceptance tested and ready for activation in an operational environment 2 months after the launch of the AM-1 spacecraft. It is anticipated that the DAAC Operations Staff will determine when Release B.1 will transition to an operational configuration.

Table 3-1. Release B.0 Mission Objectives and Capabilities

Release	Date	Site(s)	Objectives	External I/Fs	Capabilities
B.0	12/30/97	EDC DAAC GSFC DAAC LaRC DAAC NSIDC DAAC SMC	• Support to EOS-AM-1 operations • Support to Landsat-7 operations • Support to SAGE III operations • Science data processing	• EDOS • EBnet • NOAA (V0 Gateway) • NSI (General users) • ASTER DAR Gateway • Landsat-7 MOC and IAS (user interfaces) • Landsat-7 LPS, MOC, IGS, IAS, and MMO (provider interfaces) • SAGE III MOC • SCFs • FDF • DAS (Using Standard ECS Ingest Protocols and Operator Entered Subscriptions for Retrieval)	• EOS AM-1 Data processing • EOS AM-1 Data access • EOS AM-1 Data ingest and archive • Landsat-7 L0R data access • Landsat-7 L0R data ingest and archive at EDC • Landsat-7 L0R ordering support • SAGE III data ingest, archive and processing • ASTER DARs • Science Data Processing to Levels 1A and 1B. • Limited ability to produce higher level products. • Interoperability with V0 and ADCs (via the B0SOT client)

Table 3-2. Release B.1 Mission Objectives and Capabilities

Release	Date	Site(s)	Objectives	External I/Fs	Capabilities
B.1	9/1/98	EDC DAAC GSFC DAAC LaRC DAAC NSIDC DAAC JPL DAAC ORNL DAAC CIESIN SEDAC SMC	Full Release B capability including: • DAO Science Support • Full Science Data Processing • Support to ADEOS II operations	• Release B.0 interfaces • DAS (AMES to GSFC DAAC) • NASDA EOC (ADEOS II/SeaWinds to JPL DAAC) • ASTER GDS Gateway	Full Release B capability including: • Full system integration and completion of performance analysis. • Science Data Processing of Levels 1-3 products. • ADEOS II (SeaWinds) data ingest and archive • RADAR ALT data ingest, archive and processing • Two-way interoperability with ASTER IMS • Two-way interoperability with NASDA EOIS • Two-way interoperability with V0 • V0 data migration ingest and archive • Science data reprocessing

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4. Overview of Release B.0 and B.1 Functionality

Table 4-1 presents an overview of the functionality provided by Releases B.0 and B.1. It describes the functional capabilities and services provided by each ECS subsystem for Releases B.0 and B.1.

Table 4-1. Summary of Release B.0 and B.1 Functionality

ECS Subsystem/Function	Release B.0	Release B.1
Data Server Subsystem		
• Acquire Service	• Release B.0 capabilities include: - FTP pull of AM-1 (Level 0, 1A and 1B) and Landsat-7 (Level 0R) data sets - Subscription event registration and triggering for qualified or unqualified events for DAAC operators - Media/distribution selection - Production history support - Interim File support - Granule version label identification	• Release B.0 plus: - Automated (via subscriptions) FTP pull for AM-1 and Landsat-7 data sets - Order tracking and statusing using MSS Request Tracking - Price/time estimates - Order of non-science portions of a granule package - Request Management - Request priority change - On-demand processing support - Performance reporting (full) - Metadata update - Metadata problem report generation - Granule versioning - Granule deletion
• Generate ESDTs	• Dynamic add of ESDTs including: - Initial AM-1 ESDTs - Landsat-7 ESDTs - SAGE III ESDTs - Advertising services support for new ESDTs - Descriptor File generation (manual) - Dynamic Link Library file generation (manual)	• Release B.0 plus: - Automatic generation of Descriptor Files for new ESDTs - Automatic storage of Descriptor Files in Metadata Repository - Complete AM-1 ESDTs - ESDT definition GUI - DDICT interface

Table 4-1. Summary of Release B.0 and B.1 Functionality (cont.)

ECS Subsystem/Function	Release B.0	Release B.1
• Search	• Release B.0 capabilities include: - Basic search for AM-1 and Landsat-7 holdings - Search of multi-state granules - 2-Dimensional spatial searches and inserts - Search of browse data holdings	• Full capability including: - 3-Dimensional spatial searches and inserts - Search of multi-type collections - Suspend/Resume session - Mix of logical operators - Searching using Earth Science Query Language (ESQL)
• Guide Search	• None	• Full capability including: - User subscriptions for documents - Performance data collection and measurement - Keyword and full text search on documents - HTTP access to document services - API interface to document services - Support for HTML, ASCII, RTF and PDF formats - Document insert - Document search - Document acquire - Policies/Procedures support
• Data Distribution	• Release B.0 capabilities include: - Monitor and control processing for distribution requests - Operator cancellation of orders - Metadata distribution - Packing list distribution - D3 tape - 8-mm and 4-mm tape - CD-ROM - 6250 format - File compression - Processing modes - Order statusing support - Expedited L0 Data - ASTER Expedited Data and Signal File distribution	• Release B.0 capability plus: - 3480/3490 format - FAX distribution - Printing support - Partial distribution - Order Segmentation - Quality control - Cost estimation & accounting - Media quality control

Table 4-1. Summary of Release B.0 and B.1 Functionality (cont.)

ECS Subsystem/Function	Release B.0	Release B.1
• Data Storage	• Release B.0 capabilities include: - AM-1 archive capacity - Local data insert - Local and remote data acquire - Storage of single and multi-file granules - Browse data archive - Archive media storage - Cache management - Configuration parameter reporting - Data Compression/ Decompression - Archive backup & restore - Automatic deletion of expedited data	• Full capability for AM-1, Landsat-7, ADEOS, RADAR ALT and SAGE III including: - Remote data insert - Deletion of archive files - CPIO Format Support - Archive media refresh - Storage system performance reporting - Retry threshold function - Checksum error monitoring and reporting - Storage system utilization - Resource cost estimation - File retrieval time estimation - Accounting data reporting - Quality control - Failover support - Restoration of failed tape - Archive configuration modification
• Subsetting Service	• Release B.0 capabilities include: - HDF-EOS (swath) by parameter for MODIS L1B - Landsat-7 WRS scene based subsetting	• Full capability for AM-1 ESDTs including: - Spatial, temporal, altitude and parameter based subsetting of compliant HDF-EOS products - Subsampling - Averaging - Geographic masking - Swath-narrowing subsetting • Full capability for Landsat-7 ESDTs including: - Floating scene based subsetting

Table 4-1. Summary of Release B.0 and B.1 Functionality (cont.)

ECS Subsystem/Function	Release B.0	Release B.1
Ingest Subsystem • AM-1/Landsat-7/SAGE III Data Ingest	• Release B.0 capabilities include: - AM-1/EDOS Level 0 data ingest - EDOS data re-ingest - Landsat-7 Level 0R data ingest - Ingest Level 1A and 1B ASTER data from ASTER GDS - Ingest SAGE III Level 0 data from SAGE III MOC - Metadata extraction and validation for AM-1 and Landsat-7 LPS data - Request management - Session management - Data processing distribution - Data type addition - Polling Ingest - Hardcopy scanner - Suspend/Resume/Priority setting - Expedited L0 data via EDOS	• Release B.0 capability plus: - ADEOS data ingest - RADAR ALT data ingest - Barcode handling for Media Check-in - ESDT support
Planning Subsystem • Production Planning	• Partial local production planning for selected AM-1 ESDTs in a Release B planning environment including: - Production request generation - Resource plan creation - Production plan creation - Subscriptions management - Multi-file Granule - Release B production rules	• Full production planning for AM-1, RADAR ALT and SAGE III ESDTs including: - Basic automatic replan - Reprocessing - On-demand production requests - Inter-DAAC planning - Resource planning upgrades (e.g., shared allocation) - Production Request (PR) collections - Food Chain - Generate canned reports from PDPS database - Level 0 data availability prediction based upon FOS DAS
• Science Software I&T Support	• Pre-Release B (formerly Release A) planning plus: - Planning support to Release B production rules	• Full capability for AM-1, RADAR ALT and SAGE III ESDTs

Table 4-1. Summary of Release B.0 and B.1 Functionality (cont.)

ECS Subsystem/Function	Release B.0	Release B.1
Data Processing Subsystem • Data Processing	• Partial local data processing for selected AM-1 ESDTs in a Release B production environment including: - Processing to Levels 1A and 1B for AM-1 - Limited production of higher level products - Production history - Interim files - Multi-file granule - Release B production rules - Simple acquire/insert - DPREP (data pre-processing) - Full-science QA	• Full local data processing for AM-1, RADAR ALT, and SAGE III ESDTs including: - Processing to Levels 2 and 3 - Advanced exit handling - Job box consolidation - On-demand processing from PGEs and Data Server - Suspend PGEs - Resume PGEs - Inter-DAAC processing - Remote insert - Backwards chaining of multiple PGEs - QA Monitor enhancements - Non-science QA (e.g., check number and size of outputs) - Resource overrun management - Resource deadlock avoidance - Automated start time checking - Predictive staging
• Science Software I&T Support	• Pre-Release B (formerly Release A) processing and tools plus: - Release B production rules - Release B Toolkit enhancements - PGE registration	• Full processing and tools capability for AM-1, RADAR ALT and SAGE III ESDTs including: - Full subsetting production rules
Client Subsystem • User Registration and Administration	• B0SOT client capability including: - User registration - Service access management - Create and maintain user accounts and user profiles	• ECS Release B.1 capability including: - User registration - Service access management - Create and maintain user accounts and user profiles

Table 4-1. Summary of Release B.0 and B.1 Functionality (cont.)

ECS Subsystem/Function	Release B.0	Release B.1
• Client Services	• B0SOT Client capabilities including: - User profile definition - Basic Search (Directory and Inventory) - Browse - Authentication - Attribute selection - Dependent Valids display and selection - Map display - Search results display - Upgrade of B.0 at launch to include Web-based client and supporting infrastructure	• Full capability available through Web-based client including: - Order tracking at the granule package level - Order segmentation support - Coincidence and incremental search support - Guide search support - Request partitioning - User session management - User Subscriptions - User Preferences tool - Help/Training tool - Product Request Tool - Data Dictionary Tool - Document Search Tool - Support to ASTER on-demand processing requests (DPRs) - Full Subsetting support - Subsampling - Support to granule versioning - Product specific attribute searches - Metadata exceptions - ESQL interface - Data Server interface - Advertising interface - Price/time estimates - Map & Timeline display - User cancellation of orders
• ASTER DAR Creation and Submission	• Release B.0 capabilities include: - ASTER DAR creation and submittal through custom GUI	• Release B.1 capabilities include: - ASTER DAR status request transmit to ASTER GDS - ASTER DAR status display

Table 4-1. Summary of Release B.0 and B.1 Functionality (cont.)

ECS Subsystem/Function	Release B.0	Release B.1
Data Management Subsystem • Local Information Manager (LIM)/ Distributed Information Manager (DIM) Services	• None	• Full LIM/DIM capability including: - Request processing initiate/terminate - Request processing suspend/resume - Browse support - Execution of ESQL queries - Execution of single or multiple site queries - Execution of coincident search and incremental searches - Acquire request support - Support to order tracking and price estimation - Automatic incorporation of new data collections
• Data Dictionary Services	• Release B.0 capabilities include: - DDICTdatabase access - DDICT replication	• Full capability including: - Search of valids in DDICT - Support for SDSRV population of data collections in DDICT - DDICT maintenance tool - Notification on new collections - Complex attributes (climatology and phenomenology) definition and search
• ASTER Catalog Interoperability	• None	• Two-way interoperability with ASTER GDS including: - User search and browse - Acquisition of Level 1A and 1B data - ASTER price estimates - ASTER product status - ASTER product cancellation - Status tracking of user requests
• NASDA Catalog Interoperability	• None	• Two-way catalog interoperability with NASDA Earth Observing Data and Information System (EOIS)
• V0 Interoperability	• Access to V0 and ECS via the B0SOT client	• Two-way interoperability with V0 via V0 Gateway

Table 4-1. Summary of Release B.0 and B.1 Functionality (cont.)

ECS Subsystem/Function	Release B.0	Release B.1
Interoperability Subsystem • Advertising Services	• Release B.0 capabilities include: - Service advertisement installation - External provider services support - Search using standard keyword specifications - Product ads for new data types	• Release B.0 plus: - Keyword definition access to DDICT - Subscriptions on advertisements
Management Subsystem • Network Management	• Release B.0 HP Openview Network Node Manager (NNM) including: - Monitor routers, bridges, and hosts - Display and record status and events - Receive object alerts	• Release B.0
• System Administration	• Release B.0 Tivoli Management Environment (TME) including: - System administration - Database administration - COTS administration - System backup and restore - DCE Cell management	• Release B.0
• Fault Management	• Release B.0 TME and OpenView fault management including: - COTS fault/error detection - Application level fault/error detection - Operating system fault/error detection - Trouble ticketing	• Release B.0 plus: - Fault correlation

Table 4-1. Summary of Release B.0 and B.1 Functionality (cont.)

ECS Subsystem/Function	Release B.0	Release B.1
• Configuration Management	• Release B.0 capabilities include: - Software change management - Change request management - Physical network asset management - PNM/NNM configuration monitoring - Baseline management - Inventory, logistics, maintenance (ILM) - Software distribution - License administration	• Release B.0
• Accountability	• Release B.0 capabilities include: - User Registration - User Account maintenance - User profile management - Request tracking for orders	• Release B.0 plus: - Food chain support - Granule level tracking support for orders
• Performance Management	• Release B.0 performance management capability - TME and NNM threshold monitoring	• Full performance management
• Security Management	• Release B.0 capabilities include: - Password compliance monitoring - Intrusion detection	• Release B.0
• Policy Management	• Procedural capability in B.0	• Full capability including: - Policy flowdown - Policy coordination - Policy cataloging and reporting
• Manage Applications (Process Life Cycle)	• Release B.0 NNM capabilities include: - Application startup - Application shutdown - Monitor application status - Gather application metrics	• Full capability including: - Application suspend - Application resume
• Mode Management	• Release B.0 NNM capabilities include: - Applications management - Mode activation - Mode termination	• Release B.0 plus: - Process suspension - Process resume

Table 4-1. Summary of Release B.0 and B.1 Functionality (cont.)

ECS Subsystem/Function	Release B.0	Release B.1
• Event Logging	• Release B.0 agent capabilities include: - Application error recording - Management event recording	• Release B.0
• Request/Order Tracking	• Release B.0 capabilities include: - Status/tracking at order level	• Full capability including: - Cross-DAAC tracking - Retrieval by User ID - Retrieval by Order ID - Retrieval by SQL query - Granule level tracking
• Billing and Accounting Service	• None	• Full capability including: - Billing and invoicing - Data order pricing - Pre-paid account support - Accounts management - Ledger postings
• Report Generation Service	• Release B.0 capabilities include: - *Ad hoc* reports - Standard administrative reports - COTS Report Writer capability for PDPS report generation	• Full capability including: - Scheduled reports generation - HTML *Ad hoc* reports generation - Browse access to reports - Standard reports generation - Data download for special analysis - Performance/Compliance reports - Workload reports - Resource Utilization reports - User Satisfaction reports - Profiles/Characterization reports - Accountability reports

Table 4-1. Summary of Release B.0 and B.1 Functionality (cont.)

ECS Subsystem/Function	Release B.0	Release B.1
Communications Subsystem • Distributed Computing Services	• Full capability including: - Time, Name and Security Services - Security Authorization & Authentication - Server Request Framework Basic Message Passing & Persistence - Process Framework with mode management argument consumption and configuration file support - Directory Naming (Mode Management support) - Universal References - Gateway Services for DAR and Landsat-7 - File Access using DFS - File Access using ftp/kftp - File Access using BDS - Generic File copy - E-mail API - Bulletin Board API	• Release B.0
• Subscription Services	• Release B.0 capabilities include: - Operator-created subscriptions - Subscription event notification - Qualified and unqualified subscriptions for subscribable events - Time-based subscriptions	• Release B.0 plus: - User-created subscriptions - User-specified actions - User notification when product is eligible for deletion
Internetworking Subsystem • Internetworking Services	• Full capability including: - EDOS network interface	• Release B.0

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5. Detailed Description of Release B.0 Functionality

5.1 Data Server Subsystem Functionality

5.1.1 Acquire Service

For Release B.0 the Data Server Subsystem will provide access to its data holdings. This access is provided through an acquire service, or product order. A user can submit an order for either a set of, or a specific data granule. The client has the ability to status, or track the order, once submitted using MSS Order Tracking services. This status is provided at the order request level. The order is distributed either electronically or by media. See Section 5.1.5 for specific data distribution capabilities.

A standing order capability is provided by the Data Server Subsystem using Subscription Services. Subscriptions may be submitted to the Subscription Server requesting that each time a granule is inserted into the Data Server, it be acquired. This is intended to support the need to access granules that are to be inserted in the future. In Release B.0, subscriptions are created through a subscription server GUI by DAAC operations personnel. (In Release B.1, users may create subscriptions through the ECS client.) The subscribed event is triggered by the data server upon insertion of a granule. The subscription server initiates actions for subscriptions on the event. Notification to the user is performed as with any acquire: the data server sends e-mail notifying the requester.

Release B.0 also provides the capability to define a granule version label for identification of a granule version that will be used in a PGE.

5.1.2 Generate ESDTs

For Release B.0, the Generate ESDTs function enables the addition of new approved ESDTs to the system. The Generate ESDTs function defines an ESDT as a single-type collection by using Descriptor and Dynamic Link Library (DLL) Files. The Descriptor File provides information for the collection metadata attributes and values, the granule metadata attributes and their valid values, the services and their respective interfaces available on the ESDT, and the subscribable events for the ESDT. Release B.0 uses the Descriptor File which is developed by hand and by using a prototype tool called M_POP. M_POP specifies the collection level and granule level metadata attributes and their values automatically. In Release B.0, the M_POP tool will be provided to the DAACs in prototype form. Other Descriptor File data, including service definitions and subscribable event definitions, are entered by hand.

The DLL provides callable entry points for the services provided on the ESDT. New ESDTs are defined to ECS through an Operator GUI that makes the names of the Descriptor and DLL Files available to the SDSRV. Once the SDSRV receives the files, it “installs” the ESDT and notifies the necessary components of the system (Advertising and Subscription Server) about the new ESDT. When notifications to the system components are completed, the ESDT can be used actively by the system.

A list of science data ESDTs for Landsat 7, AM-1 and SAGE III products supported by the ECS will be baselined and published in the EDHS document collection. Release B.0 will include all of these ESDTs, supported by Release B.0 services (including full insert, browse and acquire functions). Release B.0 will also include the non-science ESDTs required to support B.0 data production and other B.0 services.

5.1.3 Search

The search services for Release B.0 include capabilities to interface with ECS holdings inserted from AM-1, SAGE III and Landsat. This includes search of browse data holdings. Users will be able to access these basic capabilities through the B.0 Search and Order Tool (B0SOT), which in turn will interface with the Release B.0 data server infrastructure via the V0 gateway. User queries will be based on ECS core attributes. In addition, users will be able to search as needed to support production and multi-state granules.

5.1.4 Guide Search

No services are provided by ECS in Release B.0.

5.1.5 Data Distribution

Release B.0 provides the capability to distribute data via networks and media. The following description has been provided to ensure that readers are aware of the level of functionality to be provided.

The Data Distribution CSCI enables Data Server and Operations users to monitor and control processing for distribution requests. Data distribution processing consists mainly of preparing requested data objects for distribution on specified media or across the network and subsequently delivering or causing the delivery of data products to requesting clients.

In addition to preparing the data, Data Distribution will generate the packaging materials (Packaging List). The Packing List sequentially shows all files to be delivered broken out by media instance within each media type. The first file on the first media instance will consist of a copy of the Packing List. Each media instance will contain a file listing all files contained on that instance. This file will be the first file of each media instance, except for the first media instance, where it will be the first file after the Packing List file. The following media types are supported:

a. 8-mm tape.

b. 4-mm tape.

c. CD-ROM.

d. 6250.

e. D3 tape.

Electronic distribution will include ftp push and ftp pull.

5.1.6 Data Storage

Release B.0 data storage services provide archive support for AM-1, Landsat-7 and SAGE III missions. During the Release B.0 timeframe the following data storage capabilities will be available:

- Local data insert capabilities that allow insertion of all mission data into the archive.
- Local and remote data acquire capabilities which allow users to acquire data from within as well as external to the ECS system.
- Archive media storage capabilities for mission data.
- Cache Management capabilities that provide the flexibility to go across multiple cache systems to locate data.
- Configuration parameter reporting capabilities that allow servers to configure other servers from a GUI.
- Data Compression/Decompression capabilities that support the data distribution functions within ECS.
- Archive backup and restore capabilities that provide local and off-site backup of data.

5.1.7 Subsetting Service

In order to provide full subsetting services, three levels of implementation are needed:

a. At the Computer Science Data Type (CSDT) level, Data Server software manipulates the data file(s) of a granule to extract the desired subset of the granule into new files of the same format as the original data. The HDF-EOS library provides such services for data conforming to the HDF-EOS standard.

b. For each Earth Science Data Type (ESDT), the DLL uses the subsetting software for the corresponding CSDT, passing along the parameters which control the subset to be extracted. In addition, the Data Descriptor for this ESDT describes this service and its parameters in order to advertise the service.

c. In order for end users to access the subsetting service, the Client presents the advertised services to the user and guides the user in selecting subsetting parameters (e.g., geographic extent) which will acquire the desired data.

Table 5-1 indicates which of these levels will be implemented in B.0 vs. B.1. Table 5-2 shows the end result of the B.0/B.1 implementations, in terms of the subsetting services which will be available for production and for end users.

Table 5-1. Implementation of Subsetting Layers

Formats and Subsetting Services		
Level	**B.0**	**B.1**
CSDTs	HDF-EOS (swath) • by parameter Landsat 7 L0R	HDF-EOS (swath, grid, point) • by parameter • temporal • spatial • altitude • subsampling • averaging • swath reduction • masking Landsat 7 L0R
ESDTs	Landsat 7 L0R (acquire-based) • WRS Scene and Subinterval	• All ESDTs requiring production or user subsetting • Landsat 7 L0R (floating scene)
Client	• Landsat 7 WRS Scene and Subinterval selection	• User I/F for general subsetting

Table 5-2. Subsetting Service Availability

Formats and Subsetting Services		
Implementation	**B.0**	**B.1**
Production	MODIS L1B by parameter	• Subsetting by parameter • MODIS L1B/L2 subsetted for swath reduction • MODIS L2 subsetted by geolocation • MODIS L2/L2G and MISR L2 subsetted by land mask • MODIS L2/L2G subsetted by snow/ice mask
Accessible to External Users	• Landsat 7 fixed scene selection	• Landsat 7 floating scene selection • All subsetting services appropriate for each ESDT

5.2 Ingest Subsystem Functionality

5.2.1 AM-1/Landsat-7/SAGE III Data Ingest

The Ingest services required for Release B.0 are of two parts. First, the Ingest core services are required to accept a generic ingest request, parse/validate that request, perform required file transfers, and return status. Metadata extraction and validation are available in Release B.0. The Ingest Subsystem calls a Science Data Server utility to validate the metadata and sends the metadata to the Science Data Server for insertion. Second, front end Ingest services are required to detect a request by an external data provider to ingest data. For EDOS and the interface to the SAGE III MOC, the Ingest Polling component is used. For the Landsat-7 LPS the CSS Kerberos

gateway and the Ingest Automated Network component are required. In both cases the Ingest components detect the external request and formulate a generic ingest request to be passed to the Ingest core services.

Ingest features that will be available in B.0 are:

a. Add datatypes.

b. Distribution of granule execution across processors to improve efficiency.

c. Metadata extraction and validation

d. Request Management

e. Session Management

In addition to electronic ingest, Release B.0 supports ingest of data via media for the following interfaces:

a. ASTER D3 tape ingest.

b. EDOS D3 tape ingest (for Level 0 data backup).

c. DAAC 4 mm and 8 mm tape ingest.

5.3 Planning Subsystem Functionality

5.3.1 Production Planning

This provides the capability to enter production requests, schedule resources and create production plans. It will manage subscriptions to data required as input to PGEs. Some Release B functionality will be included, most notably, support for the Release B production rules. This includes tiling, mode-based, SAGE III activation and other identified rules. This support is deemed launch-critical since they are required to fully support SSI&T. That support will be provided in production rule “aware” versions of the Production Request Editor, Subscription Manager, Production Planning Workbench and the PDPS database. Release B.0 contains the following threads:

a. Create/Activate Production Plan.

b. Create Resource Plan.

c. Manage Subscriptions.

d. Production Rule Support.

e. PDPS Database Schema Changes.

f. Multi-file Granule.

5.3.2 Science Software I&T Support

With few exceptions, ECS will support all production rules identified in CDR documentation. These include rules such as alternate/optional inputs, metadata-based activation, orbit based activation, intermittent execution and tiling. In addition the advanced temporal rule allowing input and output data sets to have different temporal ranges is supported by Release B.0. Two production rules are not fully supported: data server proxy and advanced exit handling.

5.4 Data Processing Subsystem Functionality

5.4.1 Data Processing

Partial Local Data Processing allows PGEs to be run in the production environment. This means that it will work in conjunction with the Release B.0 versions of the Planning Subsystem, SSI&T and the Data Server. DPREP is available to support the SDP Toolkit calls relating to AM-1 location. Production rules, Production History, interim files and multi-file granules are fully supported. Full science QA is supported at this release. This release includes the following threads:

a. Production History.

b. Interim Files.

c. Multi-file Granule.

d. Production Rule Support.

e. Simple Acquire/Insert.

f. DPREP.

With few exceptions, ECS will support all production rules identified in CDR documentation. These include rules such as alternate/optional inputs, metadata-based activation, orbit based activation, intermittent execution and tiling.

5.4.2 Science Software I&T Support

SSI&T provides the ability to run PGEs in both a standalone and production-like environment. It includes all SSI&T tools provided in Pre Release B, formerly Release A (i.e., Prohibited Function Checker, File Comparison Scripts) as well as PGE Registration with Release B PDPS (including Release B production rules). It provides versions of DPS and PLS (also supporting Release B production rules) to test integration of the PGEs with the production system. Remote SSI&T and all Release B Toolkit enhancements will be available at this release. This release includes the following threads:

a. SSI&T - SSAP Fix.

b. SSI&T PGE Registration.

5.5 Client Subsystem Functionality

5.5.1 User Registration and Administration

Release B.0 uses the B0SOT User Registration and Administration capability. User Registration and Administration provides the means for users to register with ECS in order to access and use the system. As part of MSS's Accountability Management Service it provides the capabilities of User Registration and User Account/Profile Maintenance. ECS provides for two generic classes of users: guest users and registered users. Guest users are users that have not submitted requests to become registered users. Registered users are those guest users that have submitted requests for a registered user account, and have accounts created for them based on an approval process. Registered users are allowed access to services and products beyond those available to guest users.

User Account/Profile Maintenance provides the operator the means to create and maintain accounts and the user profile information. The user profile contains information about the user. This includes the name of the user, a user identification code, the user's primary DAAC, the organizational affiliation, investigating group (such as an instrument team) affiliation (if any), the project the user is affiliated with, the name of the PI of the project, the mailing address of the user, the shipping address to which data needs to be sent, media preferences for orders, the user's telephone number and the user's electronic mail address (if any). User profile information can be updated by the operator when requested by the user.

User Account/Profile Maintenance also makes the user profile available to the various subsystems, such as the Data Server Subsystem and the Client Subsystem. Information such as the user's electronic mail address and the shipping address are used for the distribution of data products ordered.

5.5.2 Client Services

Release B.0 uses the capabilities provided by the B0SOT Client, which is the Release B equivalent of the former Release A Search and Order Tool (RASOT). Refer to Table 4-1 for a list of Release B.0 services.

5.5.3 ASTER DAR Creation and Submission

The Release B.0 Data Acquisition Request (DAR) capability allows ECS users to submit ASTER DARs through a custom Client GUI. The DAR submission process enables users to plan their acquisitions based on the platform's schedule as well as to specify an array of parameters that pertain to that acquisition. (Note: The DARs are submitted to the ASTER GDS system through the DAR Gateway.)

5.6 Data Management Subsystem Functionality

5.6.1 LIM/DIM Services

No services are provided by ECS in Release B.0.

5.6.2 Data Dictionary Services

The DDICT database is provided in Release B.0. This database is used by the V0 gateway to parse queries to send to the SDSRV. The services provided by DDICT are provided in Release B.1.

5.6.3 ASTER Catalog Interoperability

No services are provided by ECS in Release B.0.

5.6.4 NASDA Catalog Interoperability

No services are provided by ECS in Release B.0.

5.6.5 V0 Interoperability

Refer to Table 4-1.

5.7 Interoperability Subsystem Functionality

5.7.1 Advertising Services

The Release B.0 Advertising Service allows the user to search for advertisements (product and services). Service advertisements can be installed on the Desktop, provided by the CLS, which may (depending on the service and the current client configuration) include downloading software from an ftp server to the client's workstation. This includes both ECS services and external provider services. The Advertising Service will be able to support a more formal compliance to the Global Change Master Directory (GCMD) directory level metadata attributes. This provides the user with the capability to search on product advertisements using standard keyword specifications.

5.8 Management Subsystem Functionality

The Release B.0 Systems Management Subsystem (MSS) provides basic network and system management services for the ECS enterprise, including all SDPS, FOS, and CSMS components. Management services include fault, configuration, accountability, performance, security, and policy management.

5.8.1 Network Management

The HP OpenView Network Node Manager (NNM) COTS product is the basic network management platform. Through the underlying SNMP protocol used to communicate with network device agents, the NNM can automatically discover objects in the network, such as routers, bridges, and hosts, and display the network topology. The NNM can monitor selected MIB variables associated with an object in the network, receive alert traps generated by the object, and issue operator control commands. Device status and alert traps generated in the network are used to update network status displays automatically.

5.8.2 System Administration

The Tivoli Management Environment (TME) is installed at the Local System Management (LSM) position at each ECS site for M&O personnel to administer. The TME COTS product is the ECS system management and administration tool. This product, in conjunction with the Remedy Action Request System (ARS) COTS package, form the system-level fault management and trouble ticket tracking support within Release B.0. The TME and ARS are available at LSMs and the SMC.

5.8.3 Fault Management

Fault/error detection for COTS products will be accomplished by configuring Tivoli event adapters to monitor the COTS processes and event logs. The Tivoli event adapter will forward the fault/errors to the management console for processing/display.

ECS custom application fault/error detection is handled at the application level. For example, if an "unable to open log file" problem is detected, it is up to the programmer to either: handle it internally and not generate an error or event; generate an error so that a higher level calling application can link to the source of the fault and possibly handle it gracefully; or generate an MSS event so that it can be sent immediately to MSS as a problem. Any of these selections may be a valid choice.

5.8.4 Configuration Management

Configuration management services supported in Release B.0 include software change management, change request management, physical network asset management, baseline management, inventory, logistics, and maintenance management, software distribution, and license administration. Configuration management services are provided through use of COTS packages with some customization and shell scripts. Atria's Clearcase COTS product provides software change management functions. Pure Software's DDTS COTS product enables tracking and status reporting on configuration change requests. The Accugraph vendor's Physical Network Management (PNM) COTS product, designed for interoperation with OpenView, augments the logical network view provided by NNM by applying physical configuration attributes to network assets. Through PNM, M&O operations can develop a hierarchical physical configuration model of the network, perform node-to-node connectivity analysis, and manage all network moves, adds, and changes. HTG's XRP-II product tracks versions of configuration controlled resources that constitute ECS release and site baselines. HTG's XRP-II product records, stores, and maintains information on inventory items, logistical items, and maintenance activities. Tivoli's Courier product packages and distributes software and other files to specified destinations at both ECS and ECS-connected sites. FLEXlm and iFORLS license manager products monitor and administer COTS software licenses for ECS.

5.8.5 Accountability Management

The accountability management service in Release B.0 includes user profiles and request tracking which provide status on a user's product order. Both aspects are implemented using custom-developed software. A description of the User Account/Profile Maintenance services that are provided in Release B.0 is presented in Section 5.5.1.

5.8.6 Performance Management

Performance management services in Release B.0 are provided by HP OpenView, which monitors performance against defined thresholds for network devices and applications, and are provided by Tivoli, which similarly monitors host and operating system metrics.

5.8.7 Security Management

Security services supported in Release B.0 include password compliance monitoring and intrusion detection. The services are implemented using public domain software and COTS.

5.8.8 Policy Management

Services provided by ECS for policy management are procedural in Release B.0.

5.8.9 Manage Applications (Process Lifecycle)

Managing a system involves managing individual applications. An operator may want to start a new application, or shutdown a running application due to anomalies. Lifecycle services provide the M&O staff with the ability to manage ECS applications. Lifecycle services consist of startup and shutdown capabilities at the application level for this release. Through the ECS Managed Process Framework application MIB extension, the M&O operator at the NNM can monitor ECS client-server application status, gather application-unique metrics, receive alerts, and issue lifecycle commands to startup and shutdown.

5.8.10 Mode Management

During normal operations, it will often become necessary to test applications for future release into the operational environment. Mode Management enables the execution of multiple modes such that each mode functions without interfering with other modes, and each mode maintains data integrity throughout its execution. For example, testing a Data Server application using the same hardware/system that is executing the operational version of the same application requires that each application be aware of the domain in which they execute so that integrity of both systems is upheld. The test version of the application will only communicate with test versions of other applications, and will only store data in test versions of the database. Multiple mode definitions are supported.

Mode Management Control enables a mode to be activated, started, and terminated. Mode activation (initiated from the MMS) discovers the installed applications within the mode specific configuration subtree. The act of issuing a mode activation call enables the system to discover the installed applications and executables in support of a new mode and register them with HP OpenView. The Operator can then select one or more applications and issue the startup command. Once an application is executing, the operator can issue a shutdown command using the same methods. As a result of enabling this control functionality, HP OpenView will be able to monitor these entities (applications and processes) as well.

5.8.11 Event Logging

The Event Log provides the programmers the capability to record events. Events are broadly classified into two categories: management events, and application events. Each event is recorded with all the relevant information for identifying and for later processing. Management events need to be recorded in a history file and on some occasions reported to the Network Node Manager. Application events are only recorded into a programmer-specified file. Event log provides a uniform way for the application programmers to generate and report (record) events.

5.8.12 Request/Order Tracking

Release B.0 enables User Services to determine the current status of a user's order. The infrastructure consists of:

a. Order Objects - dynamic structures created on receipt of product orders from users. These objects store order information and status.

b. Request Objects - dynamically created as services are invoked to generate an ordered product.

c. Order Tracking Client - reads, writes and updates order and request object attributes in the order tracking database.

d. Order tracking GUI - used to display order and request attributes stored in the order tracking database.

ECS creates an order object for each user order received via the V0 gateway. As orders are processed, request objects are created for the processing of the order and it's components. At least and, in most cases, multiple request objects are created to process an order. As order processing progresses, status changes are written to the database through the order tracking client.

System operators can use the order tracking GUI to review the current status of a user's order. An initial display reads orders from the order tracking database and displays a line by line listing of all current orders and statuses for a specified user ID. By selecting a specific order, a second display displays a line by line listing of all requests and request statuses associated with the order.

5.8.13 Billing and Accounting

No services are provided by ECS in Release B.0.

5.8.14 Report Generation Service

A generic reporting capability supplied in Release B.0 generates reports derived from management data gathered from management application log files and stored in the management database. The IQ Software vendor's Intelligent Query and IQ/Access COTS product generates *ad hoc* and standard administrative reports derived from management data. This capability is provided at both the LSM and the SMC.

5.9 Communications Subsystem Functionality

5.9.1 Distributed Computing Services

Refer to Table 4-1.

5.9.2 Subscription Services

The subscription service enables users to subscribe to changes in ECS data holdings or services. The insertion of a new granule into the archive or a new advertisement into the Advertising Service are examples of subscribable events. For Release B.0 the Subscription Server will support qualified events and qualified subscriptions. Qualifiers are a way to filter out activity that might be taken on a granule that does not meet a specific criterion. A qualified event passes a set of metadata values to the subscription server each time the event is triggered. The subscription qualification must be submitted with the subscription and is comprised of a definition of the metadata values that are to be met.

For Release B.0, use of the Subscription Service is limited to DAAC operations personnel in support of science data production activities on behalf of SCF users. In B.1, users will be able to place subscriptions through the ECS client.

5.10 Internetworking Subsystem Functionality

5.10.1 Internetworking Services

Refer to Table 4-1.

6. Detailed Description of Release B.1 Functionality

6.1 Data Server Subsystem Functionality

6.1.1 Acquire Service

The Release B.1 acquire service is extended to include statusing of orders to the granule level. The capabilities will also include the capability to order other portions of the granule package in addition to the Science Granule. In addition, other services can be invoked before the acquire such as subsetting and transformation services, and the services should be able to be invoked anywhere in the component hierarchy (i.e., DIM, LIM, GTWAY, SDSRV). Price and time estimates are provided in Release B.1 as part of acquire services.

6.1.2 Generate ESDTs

ESDT Automation Tools provide a GUI environment under which authorized ECS users can automatically generate Descriptor Files for new ESDTs. This GUI expands on the M_POP prototype tool built for Release B.0 by completely automating the development of the Descriptor Files. The GUI accesses a set of ECS-controlled support files that define the valid Core Metadata field names as well as a set of default valid-values that can be used for the Core Metadata. The ESDT Automation Tool provides screens that guide the user through definition of the collection level metadata attributes and their values for the ESDT, the granule level core metadata attributes and their valid values, the granule level product-specific metadata and their valid values, the services and the interfaces provided for the ESDT, the granule package definition, and the subscribable events for the ESDT. When the user has completed the definition, the Automation Tool generates an ODL file that represents the Descriptor. Upon approval the appropriate data is stored in the ECS Science Data Server Metadata Repository. DDICT is automatically updated when a new ESDT is introduced into the ECS.

A list of Release B Science Data ESDTs supported by the ECS will be baselined and published in the EDHS document collection. Release B.1 provides full functionality for the ESDTs on that list.

6.1.3 Search

Release B.0 provided the Basic Search includes capabilities to search using query selection screens. At the Release B.1, the Extended Search includes support for ad hoc queries formulated using the Earth Science Query Language (ESQL). ESQL permits searching on product specific attributes, all levels of the pyramid that map to database attributes, and through all the components of the system (i.e., DIM, LIM, SDSRV). Users will be able to specify queries that mix logical operators (“ands” and “ors”). Users will be able to search multi-type collections in support of full data production.

In Release B.1, the SDSRV Metadata Repository will support 3-D spatial searches and inserts.

6.1.4 Guide Search

The Guide Search function provided at the B.1 Release will support the Document Data Server's capabilities fully. Users will be able to perform keyword and full text searches on documents. Document types include guides (data center, data set, sensor, source, and project), reference papers, production plans, processing reports, and algorithm descriptions. Users will have HTTP access to document services and an application programming interface. The document data server will provide services on HTML, ASCII, RTF and PDF document formats. Postscript documents stored in the ECS can be accessed, but are not supported by guide services.

Release B.1 provides user subscriptions for documents, and it provides the capability to collect and measure performance data.

6.1.5 Data Distribution

Release B.1 provides the full Release B data distribution capability including:

a. 3480/3490 format.

b. Printing support.

c. Fax.

d. Partial distribution.

e. Order segmentation.

f. Quality control.

g. Cost estimation and accounting.

Release B.1 provides functionality for media Quality Control (QC). This includes checking the QC status of all supported media for a request, and notifying of failed or not QC status.

6.1.6 Data Storage

Release B.1 data storage services provide the full ECS capabilities for the storing and archiving of AM-1, Landsat-7, SAGE III, ADEOS II and RADAR ALT mission data. In addition to the capabilities provided in Release B.0, the following capabilities will be provided during the Release B.1 timeframe:

- Remote data insert capability to allow external users to archive data into the ECS system.
- Delete archive files capability to allow files to be deleted that are already on tape devices.
- CPIO support to support tape archive, copy and/or move functions for files.
- Archive media monitoring capability to support operator triggered refresh of tapes.
- Storage system performance monitoring to provide information detailing where a request is from a processing, archive and distribution perspective.

- GUI based storage system utilization function to monitor system usage (e.g., how many files are waiting to be processed by storage management).
- Resource cost estimation capability to inform users of the approximate cost associated with processing a data request.
- File retrieval time estimation capability to identify the average processing time associated with servicing a request for a specific file or number of files.
- Accounting and data reporting mechanisms to support time and cost associated with processing a data request. Factors include size of the request, time to service the request (based upon how many hardware and software components are used to service the request), and demand for request.
- Quality control function to verify that tapes which have been written can be read automatically between Data Distribution and Storage Management.
- Failover support function that allows for the capability of the Data Storage system to failover to a different device in case of device failure.
- Archive configuration modification capability to provide the ability to search a directory structure that is being filled and redirect the directory search to another directory structure.

6.1.7 Subsetting Service

Other subsetting capabilities such as geographic masking and related functions such as subsampling and averaging will be provided in this timeframe. Likewise, these services will be defined in the ESDTs for the products that need them. Refer to subparagraph 5.1.7 for Release B.0/B.1 additional subsetting discussion.

6.2 Ingest Subsystem Functionality

Full functionality is provided in Release B.0, except for barcode handling of media check-in which is provided in Release B.1. This includes ingest support to Release B.1 data types.

6.3 Planning Subsystem Functionality

6.3.1 Production Planning

Release B.1 provides additional local planning capabilities above Release B.0. This functionality covers a variety of areas including: Basic automatic Replan, Reprocessing, On-demand Production Requests for ASTER products, use of FOS Detailed Activity Schedule (DAS) to predict the availability times of Level 0 data, upgrades to Resource Planning and use of PR collections to ease entry of many Production Requests. This release contains the following threads:

a. Resource Planning Upgrades.

b. Make EDOS DAT from FOS DAS.

c. Basic Automatic Replan.

d. Reprocessing.

e. PR Collections.

f. On-Demand Production Requests

Inter-DAAC planning allows production plans created at one DAAC to be used in producing production plans at other DAACs. The remote DAAC would then use that plan in predicting the availability times of input data sets being produced at the first DAAC. This capability will allow the DAAC planners to coordinate their production plans. Furthermore, DPS and DSS support the remote insert/acquire of data (i.e., Data archived at one DAAC used at another and data produced at one DAAC and archived at another). An additional capability provided in Release B.1 will allow the monitoring of Inter-DAAC production from the SMC. This release contains the following threads:

a. Inter-DAAC Planning.

b. Food-Chain.

6.3.2 Science Software I&T Support

In addition to the Release B.0 production rules, two production rules are fully supported in Release B.1: data server proxy and advanced exit handling.

The data server proxy rule supports parameter, temporal, and spatial subsetting, geographic masking, sub-sampling and averaging.

Advanced exit handling allows an exit code from a PGE to trigger an On-Demand Production Request for itself (probably with different runtime parameters) or for another PGE.

6.4 Data Processing Subsystem Functionality

6.4.1 Data Processing

Release B.1 provides the full local Data Processing production at a single DAAC. All types of PGEs and data will be supported, and enhancements to DPS for the increased load of the system in Release B.1 (i.e., Predictive Staging, Reduced number of job boxes) are fully implemented. It includes the improved Exit Handling, On-demand processing for ASTER products, enhancements to the QA monitor which ease the operators task by providing tighter integration with the ECS system (but provides no new functionality), and the ability to suspend and resume jobs. This release contains the following threads:

a. Resource Overrun.

b. Exit Handling.

c. Suspend/Resume.

d. Start Time Checker.

e. QA Monitor Upgrade.

f. Non-science QA.

g. Predictive Staging.

h. Job Box Consolidation.

Release B.1 includes advanced exit handling which allows the exit code from a PGE to trigger an on-demand processing request for another PGE. Also provided is the ability to suspend and resume an active PGE and the automated start time checker which alerts operators to PGEs which have not started within a threshold of the expected time.

On-Demand Processing allows On-Demand Production Requests (OPRs) to be received by the Planning Subsystem from either the Data Server (for end-user requests) or from the Data Processing Subsystem (as part of its PGE exit handling capabilities). These requests are then validated and sent on to Data Processing. This capability will mainly be used to support ASTER in the AM-1 time frame.

Another capability of Release B.1 involves inter-DAAC production. Two specific functions used to support the current inter-DAAC production plan will be available. The first of these functions is the ability for DPS to perform a remote insert of data (archive data at a DAAC other than the DAAC which produced the data). The second function involves custom subsetting used to reduce inter-DAAC bandwidth usage. Geographic masking and swath-narrowing subsetting are also available in Release B.1.

6.4.2 Science Software I&T Support

Refer to the discussion in subparagraph 6.3.2.

6.5 Client Subsystem Functionality

6.5.1 User Registration and Administration

Full functionality is provided in Release B.1 using the ECS Release B Client. New profile information provided by Release B.1 includes billing address, credit limits and ASTER DPR constraints.

6.5.2 Client Services

Release B.1 of the ECS Client will deliver the remaining Client capabilities to include order tracking at the granule package level, full subsetting support, user session management, user preferences tool, and help/training tool. This release will consist of an updated Client version to include all previous functionality along with capabilities provided in this phase (e.g., coincidence and incremental search). Release B.1 provides full subsetting support for the subsetting services listed in Table 5-1.

Granule-Level request tracking provides the ability For User Services to determine the status of an order at the Granule level. When a user calls User Services to request that status of a request, the User Services representative will be able to determine the status at the Order level first. If the order is not complete, the representative then has the ability to determine which granules of the order are not currently available for order fulfillment.

6.5.2.1 Order Segmentation

Order segmentation is the sequencing of components of a single order (e.g., do this first, then do this next, etc.). Segmentation can be requested in two ways: by the end user using the client GUI interface, and by the operator using the data server GUI interface. The purpose of order segmentation function is to provide the end user with more user friendly products. This requires the ability to determine the processing sequence within a request prior to submission or by DAAC operations staff after the request has been place in an operator intervention queue. Sequencing an order permits better resource management. Without operator interference, the acquire request will be processed in the sequence defined by the user. This may lead to delays in executing an order or receiving non-user friendly media such as mixed products (different levels of a particular product, mixed products, or mixed instrument data) on a single type of media.

The end user client GUI interface will provide the opportunity for the user to sequence their acquire request prior to submission. The primary focus for the end user controlling segmentation is to allow the user to group data by such concepts as similar ESDTs (temporal or spatial data), ESDT services, or media type for distribution. It will also permit the user to accept or reject their primary DAAC default for order segmentation.

The DAAC operations staff will be able to sequence a request based on a user's call, as a result of a flag being set at a specific DAAC, or by automatic execution of the DAAC specific default. If a flag is set, the request goes into an operator intervention state and is displayed on the DAAC operations GUI. The operators can then communicate with the end user and sequence the request based on information such as resource limitations, ESDTs, granule size, or media type prior to processing.

6.5.2.2 Request Partitioning

Request partitioning is separating a single order into multiple orders. The purpose of request partitioning function is to provide the end user with data as soon as possible. Request partitioning can be performed in two ways: by the end user using the client GUI interface, and by the operator using the data server interface.

The end user client GUI interface will provide the opportunity for the end user to partition his order into multiple orders based on accounting and billing information; resource constraints (e.g., security limitations, disk space accessible, CPU availability); and availability of granules or files. The end user will first do a query on the data. The resulting query will be returned with information on file availability including estimations on when files will be available, how long it will take to process an order, how much CPU time will be required, how much storage space will be required, and how much media by type will be required. In addition, limitations including security (which data are accessible), how much funds are remaining in the users account, and whether the user can request information on media or only through ftp.

The DAAC operations staff will be able to partition a request based on a user's call or resource limitations. This will permit partially filled orders. In the case of data not being available or some other limited resource, the operations staff can take one order and divide it into multiple orders (the original order is then terminated) permitting an end user to receive their data in multiple deliveries as the data or other resources become available.

6.5.2.3 Coincident and Incremental Search

Coincident search is the capability to compare the spatial, temporal, and other attributes of two or more data sets to determine the overlaps of these attributes. This allows interdisciplinary scientists to compare data sets of different types and find data that are co-located spatially, temporally, or both. The DIM is required for most of these searches since many of the searches will span DAACs or other providers. Incremental search is the capability to search on an already established working collection or on a result set of some other attribute. This allows the user to reduce the volume on an existing search result based on knowledge acquired as the result of the first search. In order to perform this search, the DIMs, LIMs, and SDSRVs must support this functionality as well as the specification at the client.

6.5.3 ASTER DAR Creation and Submission

The Data Acquisition Request (DAR) capability allows ECS users to status ASTER DARs through a custom Client GUI. The DAR status process enable users to track their acquisitions' state of completion. (Note: The DARs are statused via an API to the ASTER GDS system through the DAR Comm Gateway.)

6.6 Data Management Subsystem Functionality

6.6.1 LIM/DIM Services

Release B.1 provides the capability for a user to do coincident and incremental search. Coincident search is the capability to compare the spatial, temporal, and other attributes of two or more data sets to determine the overlaps of these attributes. This allows interdisciplinary scientists to compare data sets of different types and find data that is co-located either spatially, temporally or both. The DIM is required for most of these searches since many of the searches will span DAACs or other providers. Incremental search is the capability to search on an already established working collection or result set on some other attribute. This allows the user to reduce the volume on an existing search result based on knowledge acquired as the result of the first search. In order to perform this search, the DIMs, LIMs, and SDSRVs must support this functionality as well as the specification at the client.

6.6.2 Data Dictionary Services

The DDICT service in Release B.1 provides an interface that is used by the SDSRV to specify information about data collections. This is used to support searching of data collections. The DDICT provides notification of new or updated collections. The DDICT allows the client to search the DDICT service to retrieve attribute definitions and domains.

6.6.3 ASTER Catalog Interoperability

The ASTER Catalog Interoperability provides ECS users the capability to search for, browse, and acquire data from the ASTER GDS system. The acquisition of the data can include processing from Level 1A to 1B of ASTER instrument data. The ECS client will be able to submit searches that are translated to the ASTER GDS ODL language and resolved. The ASTER users will also have the capability to search, browse, and acquire ECS data. Billable products will be accessible from both systems since the billing and accounting interfaces will be in place to bill users for these products.

6.6.4 NASDA Catalog Interoperability

Refer to Table 4-1.

6.6.5 V0 Interoperability

Refer to Table 4-1.

6.7 Interoperability Subsystem Functionality

6.7.1 Advertising Services

Release B.1 adds the capability to interface the Advertising Service to the Data Dictionary Service to obtain definitions of keywords during use of the Advertising Service interface. Subscriptions on Advertisements is also provided in this release.

6.8 Management Subsystem Functionality

6.8.1 Network Management

Full functionality is provided in Release B.0.

6.8.2 System Administration

Full functionality is provided in Release B.0.

6.8.3 Fault Management

Refer to Table 4-1.

6.8.4 Configuration Management

Full functionality is provided in Release B.0.

6.8.5 Accountability Management

Release B.1 adds the capability to support food chain and granule level tracking production support.

6.8.6 Performance Management

Refer to Table 4-1.

6.8.7 Security Management

Full functionality is provided in Release B.0.

6.8.8 Policy Management

The policy management service in Release B.1 supports policy flowdown, coordination, and reporting with a capability to prepare, store, catalog, and make available for distribution both ECS-wide and site-specific policies and procedures. It uses the Bulletin Board service for posting information about ECS status, news, and events; the ECS Client and the Document Data Server for making published policies and procedures user-accessible; office automation tools for making changes; and the Software Change Manager for version control of changes.

6.8.9 Manage Applications (Process Lifecycle)

Application Server Suspend and Resume capabilities are provided in Release B.1.

6.8.10 Mode Management

Process suspension and resume capabilities are provided in Release B.1.

6.8.11 Event Logging

Full functionality is provided in Release B.0.

6.8.12 Request/Order Tracking

The Release B.1 Request Tracking Service provides the mechanism to track user order and their status (at a request level and at a granule level) as they are processed by ECS. An order may be processed by multiple ECS subsystems and at multiple DAACs. MSS maintains a database of each component of an order as it is processed. A GUI is provided to select and display orders. Orders may be retrieved by User ID, Order ID or by a general SQL query. Information and status of each order is presented in a hierarchical display showing orders as they are broken down into requests, with information and status at each level.

Granule-Level request tracking provides the ability For User Services to determine the status of an order at the Granule level. When a user calls user services to request that status of a request, the User services representative will be able to determine the status at the Order level first. If the order is not complete, the representative then has the ability to determine which granules of the order are not currently available for order fulfillment.

6.8.13 Billing and Accounting Service

The Release B.1 Billing and Accounting service will provide the following capabilities: 1) Billing and Invoicing Function for ECS billable data orders which includes the capability to generate pricing for user data orders, the capability to generate user/group bill invoices, and provide support for pre-paid accounts. 2) AR/GL accounting function for ECS user accounts. Accounts Receivable maintains current account balances for user accounts, handles receipt of user payments, and monitors the aging of accounts. General Ledger posts, updates, and maintains the balanced totals.

6.8.14 Report Generation Service

At the Release B.1, the MSS Report Generation Service provides M&O staff with access to management information across all areas of the ECS enterprise and DAAC operations. The service is implemented through the collective reporting capabilities offered by the IQ Software vendor's Intelligent Query/Access product, the Statit statistical analysis tool, the specialized

reporting associated with the various management applications, and the reporting offered by other ECS application subsystems. The service provides for the generation of regularly scheduled reports as well as *ad hoc* reports and queries. An HTML-based user interface supports convenient browse access to reports.

The Report Generation Service is for the exclusive use of ECS/DAAC management and staff responsible for monitoring system performance, workload, capacity utilization, security, reliability, accountability, configuration, and user satisfaction. The service provides for the generation of a range of standard management reports. A standard report is one for which a template specifying format and content has been designed and saved by an M&O data specialist. Standard reports can be configured to run automatically on a periodic basis (e.g., daily, monthly). ECS M&O management and staff can browse these reports from their desktop through the HTML-based user interface. Optionally, they can apply limited time and domain scope to the standard report template to generate *ad hoc* reports. The user is also given the ability to download data underlying a standard report in a text format for import into an analysis tool such as a spreadsheet.

In support of the M&O data specialist, the Report Generation Service provides the IQ Intelligent Query/Access tool and the Statit statistics analysis tool to design standard report templates and to perform *ad hoc* queries.

Standard management reports fall into the following major functional areas:

a. Performance/Compliance - these reports are designed to reveal short and long term trends in system operation relative to benchmark requirements or performance goals. An example is a report trending production operations adherence to schedule comparing planned versus actual product generation completion times.

b. Workload - these reports are designed to reveal short and long term trends in the system workload such as the number of product requests received or the number of user services requests received.

c. Resource Utilization - these reports are designed to reveal short and long term trends in the utilization of resources for correlation with workload.

d. User Satisfaction - these reports depict short and long term trends in the degree of user satisfaction with ECS products and services.

e. Profiles/Characterizations - these reports provide a statistical breakdown on the distribution of basic system parameters such as the makeup of the ECS user community and the type products and services they request, the type faults that occur in the system, and the variation in system workload according to time of day/day of week/season.

f. Accountability - these reports provide an audit/trace of significant events associated with users and their access of system resources, products, and services. These audit trails are in support of billing and accounting, security, assuring data integrity, and configuration management.

6.9 Communications Subsystem Functionality and Limitations

6.9.1 Distributed Computing Services

Full capability is provided in Release B.0.

6.9.2 Subscription Services

In Release B.1 users can create subscriptions through the ECS client. Release B.1 provides user notification and automated ftp pull acquires for AM-1, SAGE III, ADEOS II and Landsat-7 data sets. The subscription service enables users to subscribe for ECS holdings once they become available in the ECS archive (e.g., upon processing, or advertising, etc.). This service applies to ECS data holdings, ECS documents, ECS posted advertisements. The Release B.1 Subscription Server replaces the Release B.0 version to provide actions other than notification and ftp pull, such as media distribution, notification bundling, etc.

The Release B.1 subscription service is extended to include statusing of orders and requests using the MSS Request Tracking. In addition, other services can be invoked before the acquire such as subsetting and transformation services and the services should be able to be invoked anywhere in the component hierarchy (i.e., DIM, LIM, GTWAY, SDSRV).

6.10 Internetworking Subsystem Functionality and Limitations

6.10.1 Internetworking Services

Full capability is provided in Release B.0.

Abbreviations and Acronyms

AM-1	EOS AM Mission spacecraft 1, morning spacecraft series -- ASTER, CERES, MISR, MODIS, and MOPITT instruments
API	Application Programming Interface
ARS	Action Request System
ASCII	American Standard Code for Information Interchange
ASTER	Advanced Spaceborne Thermal Emission and Reflection Radiometer (formerly ITIR)
CD-ROM	Compact Disk - Read Only Memory
CDRL	Contract Data Requirements List
CERES	Clouds and Earth's Radiant Energy System
COTS	Commercial Off-The-Shelf (hardware or software)
CSCI	Computer Software Configuration Item
CSMS	Communications and Systems Management Segment (ECS)
DAAC	Distributed Active Archive Center
DAR	Data Acquisition Request
DDICT	Data Dictionary
DDIST	Data Distribution
DDTS	Distributed Defect Tracking System
DLL	Dynamic Link Library
e-mail	Electronic Mail
ECS	EOSDIS Core System
EDOS	EOS Data and Operations System
EDHS	ECS Data Handling System (Web site)
EOC	EOS Operations Center (ECS)
EOSDIS	Earth Observing System Data and Information System
ESDIS	Earth Science Data and Information System (GSFC Code 505)
ESDT	Earth Science Data Types

FOS	Flight Operations Segment (ECS)
ftp	File Transfer Protocol
GSFC	Goddard Space Flight Center
GUI	Graphical User Interface
HP	Hewlett Packard
HTML	HyperText Markup Language
HTTP	HyperText Transfer Protocol
IQ	(software vendor)
L-7	Landsat-7
L0	Level 0
Landsat	Land Remote-Sensing Satellite
LSM	Local System Management (ECS)
M&O	Maintenance and Operations
MIB	Management Information Base
mm	Millimeter
MSS	Systems Management Subsystem
NNM	Network Node Manager
PNM	Physical Network Management
SCF	Science Computing Facility
SDPF	Science Data Processing Facility Sensor Data Processing Facility (GSFC)
SDPS	Science Data Processing Segment (ECS)
SDSRV	Science Data Server
SMC	System Monitoring and Coordination Center
SNMP	Simple Network Management Protocol
SSI&T	Science Software Integration and Test
TBR	To Be Resolved
TME	Tivoli Management Environment
TRMM	Tropical Rainfall Measuring Mission (joint US-Japan)

TSDIS	TRMM Science Data and Information System
V0	Version 0
V0.1	Version 0.1
V0.2	Version 0.2